SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Manufacturing Engineering.

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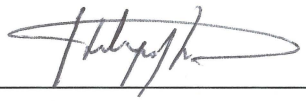

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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DEVELOPMENT OF LOW COST 3D PRINTER

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ABSTRACT

Nowadays 3D printer has become a big challenge in technology of prototyping using the printer. This technology is not only used in industries of manufacturing but used for prototyping for an important constraint. This project is to develop low cost 3D printer but not only about the cost budget effective as output but the working process of the 3D printer.

The output of this project expects to give benefit for the common people with the effectiveness cost. 3D printing technologies are available to build a 3D object printing but this project aims to use the 3D manufacturing process that gives the effectiveness solution at low wastage of printing materials. The 3D printer capable of outputting in difference colours and different materials are already exist and will be continue to improve a point of functional product as output products. Now, 3D objects were bought from the online market and assemble the part of 3D printer.

The original 3D printer is used as a reference for the actual position of components in 3D printer. Learn about the 3D printer in spread and research the process from first step until finish used observation through YouTube, website and research paper. The modification of 3D printer made from wood to ensure cost lower. Using the 3D printer modified make the difference design through the CATIA and Thinker cad and printing the product. To ensure the frame in the strength position the Finite element analysis used to simulate the process load that will be force at hot bed surface and frame using fiber wood.

ABSTRAK

Pada masa kini pencetak 3D telah menjadi satu cabaran besar dalam teknologi prototaip menggunakan pencetak barangan. Teknologi ini hanya digunakan bukan sahaja dalam industri pembuatan tetapi digunakan untuk prototaip dengan keadaan penting. Projek ini adalah untuk pembangunan pencetak 3D kos rendah tetapi bukan sahaja tentang kos bajet berkesan sebagai pengeluaran object tetapi proses kerja pencetak 3D.

Selepas projek ini mendapat sentuhan terakhir, ia akan memberi manfaat untuk rakyat biasa dengan keberkesanan kos. Teknologi percetakan 3D yang ada untuk membina sebuah percetakan objek 3D tetapi projek ini bertujuan untuk menggunakan proses pembuatan 3D yang memberi keberkesanan penyelesaian di pembaziran rendah bahan percetakan. Pencetak 3D mampu dikeluarkan dalam perbezaan warna dan bahan yang berbeza sudah wujud dan akan terus meningkatkan titik produk berfungsi sebagai pengeluaran produk. Sekarang, objek 3D telah dibeli dari pasaran dalam talian dan memasang bahagian pencetak 3D.

Pencetak 3D digunakan sebagai rujukan untuk kedudukan sebenar setiap komponen dalam pencetak 3D. Belajar mengenai pencetak 3D dalam meluas melaui proses penyelidikan dari langkah pertama sehingga penamat menggunakan pemerhatian melalui YouTube, laman web dan kertas penyelidikan. Pengubahsuaian pencetak 3D diperbuat daripada kayu untuk memastikan kos yang lebih rendah. Menggunakan reka bentuk pencetak 3D yang diubah suai membuat perbezaan melalui CATIA dan Thinker cad dan mencetak produk. Untuk memastikan rangka dalam kedudukan kekuatan unsur terhingga proses analisis yang digunakan untuk mensimulasikan beban yang akan menjadi kuasa di permukaan katil panas dan bingkai menggunakan gentian kayu.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter discusses about the introduction, concepts and overall ideas about low cost of 3D printer. Besides, the background of the project, problem statement, objective of the project, and the scope of the research will be described in detail in this chapter.

1.2 BACKGROUND OF STUDY

Everything around us such as toys, medical tools and buildings are designed can be created by 3D printing, making them a necessity in today's society. Toys companies are often referred to a new technology and the industry is commonly to fulfil the children and all of the age to ensure the products is suitable for different age.

The toy industry is among the biggest beneficiaries of the technology in world. Toys have different type and design such as the toy action figures which is characters of every toy. Kids love the way that Action Figures can bring their favourites characters to life. Toys are already as tend to be small, different design and made out of plastic, making it easy to 3D print them.

3D printing refers as process that used to synthesize a 3D object which successive layers-by-layer of filament or powder are formed using the computer control to create a 3D object or product. The objects produce in any shape or geometry and can be produced from digital model data 3D model or another electronic data source such as an Additive Manufacturing File (AMF) file. The term 3D printing has its

origin sense 3D printing in reference to a process that deposits a binder material with inject heads layer by layer at one layer only one time.

3D printing most commonly uses manufacturing industries to produce the product in small part. This printer can make simple process, to ensure the shape that we need able is processed. Using 3D printer can help to make the complete product and only need to produce using CATIA and using 3D printer to print the small product base on the drawing.

1.3 PROBLEM STATEMENT

The cost to make one 3D printer machine is expensive and need to use a different filament to ensure the product is perfect. The cost to buy the machine 3D printer is higher for personal costumer.

1.4 OBJECTIVE OF STUDY

The research objectives are stated as follows:

- To study the 3D printing process.
- To develop the low cost of 3D printing.
- To produce the 3D part using the 3D printing.

1.5 SCOPE OF STUDY

This project objective is narrowed down by performing scopes of study.

- The project is development of low cost 3D printer. Need study about the process and assemble components of printer ensure full fill requirement of users and cost less than market prices.
- The study will able to make assembly components of 3D printer for a period of FYP 2.
- The product by 3D printer able to be produced by CATIA and Thinker Cad software.

1.6 ORGANIZATION OF WRITING

Thesis writing will be organized by show all the process flow that applied to complete the research, this flow will be discussed in details by listing and describing the chapters need in this thesis as follows:

CHAPTER 1: INTRODUCTION AND GENERAL INFORMATION

This chapter consists of: research background of 3D printing, problem statement, research objective, scope of research, data collection and how organization of waiting.

CHAPTER 2: LITERATURE REVIEW

This chapter about material that uses to producer that product of 3D printing, process of 3D printer, software, and process to convert the 3D cad into STL file.

CHAPTER 3: METHODOLOGY

This chapter explains about flow 3D printer will make to ensure to develop the low cost, Gantt chart, budget plan and the expected outcome.

CHAPTER 4: RESULT AND DISCUSSION

This chapter explains about the result of data collected from 3D printer processed. Data analysis in this chapter using ANSYS to determine the load minimum and maximum from the 3D parts of printer.

CHAPTER 5: CONCLUSION

This chapter will summarize overall of project and recommendation future for printer parts information perform in 3D printer.

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